Claim Rejections - 35 U.S.C. § 103

Claims 1-15, 18-20, 22-38, 41-43, 45 and 46 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Birdwell et al (6,172,972) in view of Anderson et al (6,434,137). This rejection is traversed for at least the following reasons.

The present invention concerns the method and apparatus for providing an overall transport mechanism for two-way transmission of frame relay data between private/public frame relay networks over a satellite/wireless network. Within a frame relay network, as illustrated in Fig. 1, additional frame relay processing is conducted in order to efficiently carry frame relay packets over satellite/wireless links. Processing at the physical layer and data link layer include the formatting of data into variable length packets, segmentation, reassembly and re-sequencing of the data as well interleaving of frames to spread the effect adverse areas. In particular, the system uses a flexible frame format in which frame relay data packets are segmented into smaller packets called "spackets." Several variable-sized spackets can be transmitted in a frame and a single spacket can be transported over several frames. The transmission is with a variable number of error correction code bits.

A key feature of the invention is the establishment of data queues and the prioritization of data based on priorities, including the establishment of high and low priority date queues and high and low priority virtual channels (VCs). In the exemplary embodiment of Fig. 2, a prioritizer/VC identifier segmentation processor 22 distributes cells that are received from network 10 to priority queues based upon an assigned priority. A scheduler 24 transmit cells

from these priority queues. The cells are transmitted on a first in-first out (FIFO) basis. The queues are performed at the VC level, which has separate queues for each VC.

The segmentation of variable-length frame relay packets into spackets, which allows efficient scheduling of packets belonging to multiple priorities, permits a high priority packet to be transmitted without waiting the transmission of lower priority packets. Since a frame relay packet is segmented into one or more spackets, as illustrated in Fig. 4, the current transmission of a low priority frame relay packet can be interrupted by the transmission of higher priority frame relay transmissions. All spackets but the last one representing a frame (due to variability) are the same length and have a unique header that contains the VC identifier to which the packet belongs. The header contains both packet and sequence numbers so that reassembly is readily achieved. As explained at pages 7 and 8, the sizes of the fields and payloads are variable, depending upon system conditions.

These essential features of the frame relay transport method and system are recited in independent claims 1 and 24, respectively. In particular, the invention is defined as being related to a frame relay processing where frame relay packets are received. Consistent with the high speed techniques implemented by the invention, the frame relay packets are prioritized and, each of the payload data portions of a frame relay packet is segmented to form a plurality of "spackets". The transmission of the packets is scheduled in accordance with priorities of the frame relay packets to which the spackets correspond. These prioritized packets are then placed into satellite/wireless frames and transmitted over the satellite or wireless network.

Birdwell

The Examiner refers to Birdwell as the primary reference for the rejection and asserts that the reference discloses transporting frame relay data over a satellite, with reference to column 2, lines 41-42 and Fig. 2. This assertion is in error. Nowhere in the reference is there any mention of "frame relay". Thus, on its face, Birdwell is distinguishable. Frame relay is a clearly distinct technique for transmission of information in the wireless/satellite environment and has qualities significantly different from those of other packet or cell-based techniques. There is no teaching or suggestion that the principles of Birdwell may be applicable to a frame relay application.

The Examiner further finds that steps of receiving frame relay packets and segmenting payload data of each of the frame relay packets is found in Birdwell. Again, in the absence of any mention of frame relay packets in the reference, there is no basis for this assertion. Further, with reference to the segmenting feature, the claim requires the formation of smaller packets from each of the frame relay packets. The Examiner's citation of the teachings at col. 3, lines 9-18 would appear to relate to the formation of MPT packets that are of a size appropriate for transmission over the satellite system and are sized to 127 bytes. The process of Fig. 3, which is referenced by the Examiner, involves encoding the network data packet into a variable length MPT frame (step 102) and then encoding the MPT frame into fixed-length MPT packets (step 104), and finally embedding the MPT packets into satellite packets (step 106). The entire MPT packet is embedded into a 127 byte payload of a conventional 147 byte DSS packet. Thus, the packets are placed as the data payload within standard fixed-sized packets suitable for transmission across a particular distribution medium, such as the DSS network. Based on this description, the payload has a fixed length MPT packet and associated header information.

Contrary to the Examiner's assertion, this DSS packet does not contain multiple MPT packets. Thus, the claimed step of forming fixed-sized satellite/wireless frames, each containing plural spackets, cannot be found in Birdwell.

Further, the formation of fixed-sized satellite/wireless frames includes the use of variable number of error correction code bytes in each frame. Nothing of this sort is taught in Birdwell. With reference to col. 5, lines 30-47 and col. 6, lines 12-26, it is clear that there is no variable number of error correction code bytes. On the contrary, the number of bytes is fixed.

Finally, the Examiner admits that Birdwell fails to disclose queues with priorities. This is a fundamental feature of the present invention, as it (1) indicates the recognition that different data should have priorities, (2) applies such priorities to the frame relay packets and, more importantly, (3) the subdivision of such packets in the form of "spackets."

The Examiner looks to Anderson for such teachings and asserts that Anderson discloses the use of message priorities stored in different queues and that Anderson would be combinable with Birdwell. First, Anderson does not remedy the deficiencies of Birdwell or otherwise teach how Birdwell could be modified to meet the claim limitations, even excluding the priority feature. Second, Anderson does not teach other critical features of the invention.

Specifically, Applicants wish to note that the order of steps in Applicants' invention includes receiving frame relay packets, prioritizing the packets, segmenting the payload to form spackets and scheduling transmission of the spackets in accordance with the priorities of the frame relay packets to which the spackets correspond. This order is not found in Anderson. Moreover, because of this difference, it would not be obvious to one of ordinary skill in the art to

modify Birdwell in a manner that could apply the teachings of Anderson. There is no teaching or suggestion as to why one of ordinary skill would wish to have prioritization in the system of Birdwell. Birdwell has no indication that different internet protocol data should be treated with different priorities. In the present case, Applicants first prioritizes and then segments, followed by scheduling and forming of fixed sized satellite/wireless frames.

On the basis of the foregoing, Applicants respectfully submit that nothing in Birdwell alone or its combination with Anderson would render the present invention obvious. Accordingly, all the claims should be considered patentable and the application passed to issue.

Respectfully submitted,

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